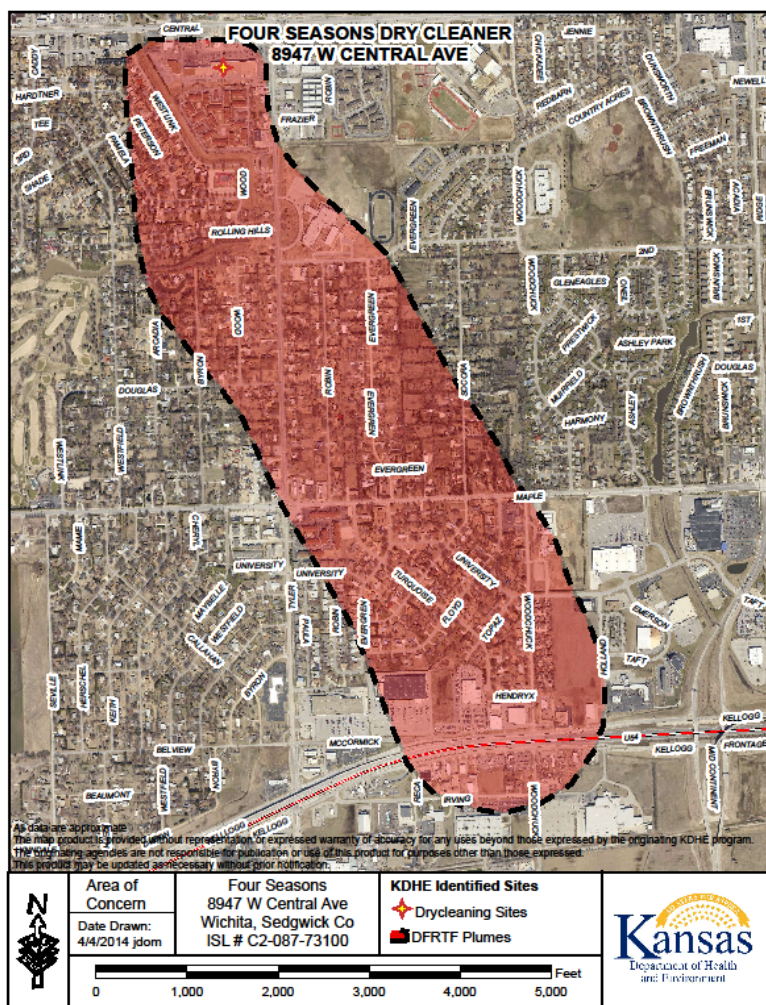


What is the Problem?

The groundwater near and south-southeast of the former Four Seasons Dry Cleaners near W. Central and N. Tyler in Wichita has been contaminated by volatile organic chemicals (VOCs). VOCs are liquid or solid chemicals that can easily evaporate into gases and are a significant source of pollution in the environment, sometimes found in the groundwater beneath certain industrial businesses, such as dry cleaners.



A VOC commonly used at dry cleaning facilities is tetrachloroethylene, also known as PCE. Historically, PCE is a predominant chemical solvent used in dry cleaning, but it is also used in the cleaning of metal machinery and to manufacture some consumer products and other chemicals. It is a clear, colorless liquid that has a sharp, sweet odor and evaporates quickly. PCE is an effective cleaning solvent and historically has been used by many professional dry cleaners because it removes stains and dirt from common types of fabrics. PCE is a toxic chemical with both human health and environmental concerns. The map shown below depicts the general area of concern, which is the groundwater plume plus a buffer of up to one block from the suspected boundary of the contamination.



What about PCE in Groundwater?

PCE in groundwater can cause problems for people who depend on well water for domestic and lawn & garden (L&G) purposes. In this fact sheet, water from domestic wells is assumed to be used for drinking, cooking, laundry and other household uses inside the home; L&G wells are primarily used for outdoor purposes.

PCE was the primary solvent used at the Four Seasons Dry Cleaners and is found in the groundwater. PCE degrades to trichloroethylene (TCE), cis 1,2-dichloroethylene (DCE) and vinyl chloride (VC) so in addition to PCE residents may see some of the degradation compounds in the analytical reports

VOCs will dissolve into groundwater, but at low amounts PCE cannot be perceived by smell or taste. For example, people typically do not smell PCE in air at concentrations below 1 ppm (parts per million), which is equivalent to 1,000 parts per billion (ppb).

The source of the contamination may be from normal dry cleaning operations, including but not limited to separator water disposal through the sewer system, disposal of spent filters in dumpsters and small leaks and spills. Most of the disposal options were considered appropriate methods prior to 1995.

What is a Chronic Exposure?



PCE risk is calculated based on a chronic exposure. **Chronic** health effects are characterized by prolonged or repeated exposures over many days, months or years. Symptoms may not be immediately apparent. Risk based calculations are commonly based on a 30 year exposure.

Acute health effects are characterized by sudden and severe exposure and rapid absorption of the substance. Normally, a single large exposure is involved. Acute health effects are often reversible. Examples: carbon monoxide or cyanide poisoning.



What are safe levels of VOCs in drinking water?

The Environmental Protection Agency (EPA) has established safe drinking water standards called maximum contaminant levels (MCL). The standards for many of the VOCs commonly found in water, measured in parts per billion (ppb), are listed in the table below. Residents with tap water above MCLs are advised not to consume the well water. Standards are risk-based and reflect the potential for human health risks from exposure to potentially harmful substances at contamination sites.



Note: 1 ppb equals 1 microgram per liter.

Chemical Name	EPA MCL (ppb)
Tetrachloroethylene (PCE)	5
Trichloroethylene (TCE)	5
Cis 1,2-Dichloroethylene (Cis 1,2-DCE)	70
Vinyl Chloride (VC)	2



What are the non-cancer human health concerns associated with PCE?

At certain levels over a sustained period, exposure to PCE can cause adverse non-cancer effects on the human nervous system. Long-term exposure to PCE can also pose a potential human health hazard to reproduction and development, and to the kidney, liver, immune and hematologic systems. The risk of any non-cancer health effects from PCE exposure depends on the amount of PCE a person is exposed to and how long the exposure lasts. People exposed to high levels of PCE, even for brief periods, may experience symptoms such as dizziness, fatigue, headaches, confusion, nausea, and skin, lung, eye and mucous membrane irritation.



http://www.epa.gov/oppt/existingchemicals/pubs/perchloroethylene_fact_sheet.html

What level should be used to determine if it is safe to shower or contact the water?

KDHE calculated site-specific Removal Management Levels (RMLs), which are chemical-specific concentrations calculated for PCE, TCE and vinyl chloride in tap water. The RMLs are used to help KDHE decide when to undertake a removal action, such as supplying an alternative water supply (e.g. carbon filtration) for all uses in a household. KDHE selected the most conservative RML based on exposure to a child and taking into consideration non-carcinogenic health risks, ingestion, inhalation and dermal (skin) contact. Residents with tap water above the RMLs are either being connected to existing water mains or temporarily provided a point of entry carbon filtration system for use within the home if a water main is not available on their street. Residents with tap water contamination below the RMLs, but above the MCL are receiving bottled water until a permanent alternative drinking water supply such as connection to a city water supply is made available.



Based on a child-based risk, a PCE RML of 104 ppb and TCE RML of 7.7 ppb was calculated for this site. The adult PCE RML is 156 ppb and TCE RML is 9.9 ppb. Property owners with tap water contaminant concentrations exceeding the RML are advised to not use the private well water to shower, bath or allow any type of inhalation or contact. With the skin. Specific RMLs for ingestion, inhalation and dermal contact are available by contacting KDHE.

Citation: United States Environmental Protection Agency Regions 3, 6, and 9. (3/31/2014). Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

Can PCE cause cancer?

EPA has determined that PCE is a “likely human carcinogen.” The cancer-causing potential of PCE has been extensively investigated. In laboratory studies, PCE has been shown to cause cancer in rats and mice when they ingest or inhale it. There is also suggestive evidence, from several studies of workers in the laundry and dry cleaning industry, that PCE exposure is associated with elevated risks of certain types of cancer (including bladder, non-Hodgkin lymphoma, and multiple myeloma). As with all health effects, the potential for an increased risk of cancer depends on several factors including how much PCE exposure there is, how often the exposure occurs, and how long it lasts. Workers from a dry cleaning facility are routinely exposed to much higher concentration than people with contaminated drinking water wells.

http://www.epa.gov/oppt/existingchemicals/pubs/perchloroethylene_fact_sheet.html

What to do if the well has VOC levels above the safe drinking water standard?

Please consult KDHE to discuss specific precautions and review the analytical results if well water sampling indicates a domestic well is contaminated. If your domestic well has VOC levels above the MCL, you are advised to not drink or cook with the well water, and you should arrange for an alternate water supply such as bottled water. If you boil the water please ensure the area is well ventilated because VOCs can escape into the air where they can be inhaled.

If the tap water is greater than the RMLs described on Page 2, you are advised to stop using your water. If a resident chooses to continue use of the water, caution is urged with certain household activities, like bathing, showering, hand washing, doing dishes and using appliances such as dishwashers or laundry machines. This is because VOCs will escape into the air, where they can be breathed by people in the room or immediate area.

Ventilating indoor areas (e.g., bathrooms) by opening windows or using exhaust fans while you are using your water will reduce the amount of VOCs present in the air you breathe.

Is there a way to filter VOCs out of my water?

Some filtration systems can filter VOCs out of your water. The most common types of filtration used are activated carbon filter or reverse osmosis systems. These can be installed at the faucet (point-of-use systems), or where water enters your home (point-of-entry systems).



A point of use (POU) filter is installed in-line with the water supply line just before the faucet. One example is an under-sink unit where the water passes through the carbon filter to the faucet. Other examples of point of use filters are the GAC pitcher filters commonly sold in grocery and discount stores or GAC filters that are a part of a refrigerator's icemaker.

Point of entry systems use larger tanks and provide a safe water supply for all household uses, including bathing and laundry. Although they can handle more volume the cost is higher for installation and maintenance. Keep in mind that filtration systems require regular maintenance and replacement of the carbon or reverse osmosis filters in order to work properly.



Use of KDHE-funded bottled water or carbon filtration?

Due to the large scope of this project KDHE requests the residents assistance in keeping the costs low for the short term alternative water supply. Residents receiving bottled water are provided three full 5-gallon jugs of water and a pump. KDHE's supplier will give instructions regarding when to replace the empty jugs. Please limit the use of this water to human consumption. Unless specifically told otherwise, a resident being provided bottled water has private well water that is considered safe to use for non-ingestion purposes, such as showering, laundry, etc.

Properties receiving carbon filtrations systems will have the system installed for in house use only. Watering a lawn with treated water will prematurely use up the carbon. Use of contaminated water for lawn and garden purposes is typically not a problem if applied through sprinklers. Sprinklers lead to water aeration and stripping of the contaminants. KDHE will need access to the filtration system routinely to test for effectiveness.

What is the long term alternative water supply?

The use of bottled water and carbon filtration systems provided by KDHE is a short term option. KDHE is working with the City of Wichita and private plumbing contractor to quickly connect homes in the area of concern to the City of Wichita public water supply system. If water mains are not available, KDHE will fund the installation of new water mains, as needed. Owners are asked to sign an agreement allowing KDHE to proceed with the water connection. All KDHE funded hookups will include a pressure regulator due to the expected increase in influent water pressure when switching from a private well to the city system.

The water connections are a one time offer, but the property owner will be given adequate time to consider their options. The City of Wichita has a city ordinance requiring property owners in contaminated areas to connect to a city water source. Property owners who decline KDHE's offer to connect to city water will be notified in writing of the discontinuance of any KDHE-funded bottled water or carbon filtration. The goal is to have city water mains installed and connections completed during the summer or fall 2014.

Acceptable uses for a Lawn & Garden Well:

Unless specifically advised by KDHE, lawn & garden wells that are contaminated with low level VOCs may be safe for some uses if these guidelines are followed:

Ways of using the water	How you can protect your health
Watering lawns, washing cars, gardening or playing in the sprinkler	<ul style="list-style-type: none"> • Cold water releases fewer VOCs, and using the water outdoors allows remaining VOCs to escape into the air where they are diluted and cannot be breathed in as easily. • Avoid drinking or accidentally swallowing the water. • Use a sprinkler when water the lawn or garden. This will promote volatilization of the VOCs. • Studies indicate that plant uptake of PCE are negligible and do not pose a serious risk to human health. Residents should thoroughly wash plants and vegetables from the garden.
Filling private pools, spas and wading pools	<ul style="list-style-type: none"> • Wait 24 hours after filling the pool before using it to allow some of the VOCs to volatilize. • Make sure the pool is kept outside and not covered. • Avoid drinking or swallowing the water. Supervise children and pets.
Using the water in indoor shops or garages, greenhouses or other enclosed areas	<ul style="list-style-type: none"> • VOCs will “off-gas” into the indoor air, which means that you can breathe in the chemicals. • Make sure the area is well ventilated by keeping doors and windows open, and using exhaust fans, if possible. • Keep the time spent in the area where the water is used to a minimum.
Watering animals, pets and birds	<ul style="list-style-type: none"> • Animals can be affected by VOCs in a similar manner as humans. • A hose and spray nozzle can be used to fill a bucket or other container. The spray will help promote volatilization. A full bucket of water can be left overnight to allow additional time for the VOCs to volatilize.

What if I want to test my well water for VOCs?

KDHE’s Dry Cleaning Program will sample homes determined to possibly be impacted by the Four Seasons Dry Cleaning contamination. If you want to find out on your own if a well is contaminated with VOCs, a sample of your water should be analyzed by an accredited laboratory for VOCs using EPA Method 8260. Many laboratories are accredited by Kansas that can give you the information and instructions you need to get your well water tested. For a list of accredited laboratories in Kansas, visit <http://www.kdheks.gov/labs/index.html>.

In addition, some environmental consultants can assist with collecting and analyzing water samples.

What is the long-term plan?

Alternative Water Supply: KDHE’s Dry Cleaner Remediation Program will contract with private plumbing companies to connect homes and businesses in the area of concern to existing city water lines. The area of concern will include property with impacted private wells and a buffer zone around the contamination. The extent of the buffer zone is still to be determined.



Drinking Water Investigation: The water well investigation is being split into two primary phases. Phase I evaluated many wells and allowed KDHE to identify the groundwater plume. Phase II will likely commence in April/May 2014 and include additional investigation and sampling of select private wells outside the initial area of concern to verify the initial findings were correct. KDHE will contact residents who are chosen for Phase II sampling.

Expanded Assessment: KDHE will conduct a source investigation and expanded site assessment to further delineate the soil and groundwater contamination. Groundwater monitoring wells will be installed to monitor any changes to the contaminant plume. This evaluation will include a vapor intrusion investigation to ensure vapors from the groundwater plume and source area are not adversely affecting occupants of nearby structures.

Remediation: Long term corrective action will include designing and implementing a remediation system to remove the soil contamination and begin reducing the groundwater contamination. Remediation is unlikely to begin for several years due to funding limitations.

KDHE Contact Info: KDHE Dry Cleaning Remediation Program: 785-291-3252, Web Page: www.kdheks.gov/dryclean
 Project Mgr: Darryl Morgan, 785-296-8025, email dmorgan@kdheks.gov, Mail: 1000 SW Jackson, Ste. 410, Topeka, KS 66612-1367